

Government Science College, Jabalpur



**Syllabus (I,II,III) Year
2022-23**

Computer Science

Government Science College, Pachpedi, South Civil Lines, Jabalpur, Madhya Pradesh 482001

email: hegsjab@mp.gov.in, Website: mphighereducation.nic.in/sciencecollege

Phone : 0761-2678737 fax : 0761-2621272

B.Sc. i Year

PART A: Introduction			
Program: Certificate	Class: B.Sc.	Year: I Year	Session: 2021-22
Subject: Computer Science			
1.	Course Code	S1-COSC 11	
2.	Course Title	Computer System Architecture (Paper 1)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course	
4.	Pre-Requisite (if any)	To study this course, a student must have had the subject Physics/Maths in 12 th class.	
5.	Course Learning Outcomes(CLO)	<p>On completion of this course, learners will be able to:</p> <ol style="list-style-type: none"> 1. Understand the basic structure, operation and characteristics of digital computer. 2. Be able to design simple combinational digital circuits based on given parameters. 3. Familiarity with working of arithmetic and logic unit as well as the concept of pipelining. 4. Know about hierarchical memory system including cache memories and virtual memory. 5. Understand concept and advantages of parallelism, threading, multiprocessors and multicore processors. 6. Know the contributions of Indians in the field of computer architecture and related technologies. 	
6.	Credit Value	Theory – 4 Credits	
7.	Total Marks	Max. Marks : 25+75	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Hrs. per week			
Total No. of Lectures: 60 Hrs.			
Module	Topics	No. of Lectures	
I	<p>Fundamentals of Digital Electronics: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Binary and other Codes, Error Detection Codes.</p> <p>Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits, simple combinational circuit design problems.</p> <p>Circuits- Adder- Subtractor, Multiplexer, Demultiplexer, Decoders, Encoders Flip - Flops, Registers, Counters.</p>	10	


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II	Basic Computer Organization: Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts, Complete Computer Description & Design of Basic Computer.	10
III	Instructions - Instruction formats, Addressing modes, Instruction codes, Machine language, Assembly language. Register Transfer and Micro operations - Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations.	10
IV	Processor and Control Unit - Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, Instruction Format, Data Transfer & Manipulation, Program Control, Introductory concept of RISC, CISC, advantages and disadvantages of both. Pipelining – concept of pipelining, introduction to Pipelined data path and control – Handling Data hazards & Control hazards.	10
V	Memory and I/O Systems - Peripheral Devices, I/O Interface, Data Transfer Schemes - Program Control, Interrupt, DMA Transfer. I/O Processor. Memory Hierarchy , Processor vs. Memory Speed, High-Speed Memories, Main memory, Auxiliary memory, Cache Memory, Associative Memory, Interleaving, Virtual Memory, Memory Management.	10
VI	Parallelism – meaning, types of parallelism, introduction to Instruction-level-parallelism, Parallel processing challenges, Applications. Flynn's classification – Introduction to SISD, SIMD, MISD, MIMD Hardware multithreading – Introduction, types, advantages and applications. Multicore processors – Introduction, advantages, difference from multiprocessor.	8
VII	Indian contribution to the field – Contributions of reputed scientists of Indian origin - like - Dr. Vinod Dham – Father of Intel Pentium Processor, Dr. Ajay Bhat – Co-Inventor of USB Technology, Dr. Vinod Khosla- co-founder of Sun Microsystems, Dr. Vijay P Bhatkar - architect of India's national initiative in supercomputing, and many others. Parallel Computing projects of India – PARAM, ANUPAM, FLOSOLVER, CHIPPS etc. Other relevant contributors and contributions.	2


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Keywords/Tags: Digital Electronics, Logic Gates, Circuits, Instruction formats, Addressing Modes, Parallelism, Pipelining, Memory Hierarchy, Multicore, Multithreading, SISD, SIMD, MISD, MIMD, PARAM, ANUPAM, FLOSOLVER, CHIPPS

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

- M.Morris Mano, “Computer System Architecture”, PHI.
- Heuring Jordan , “Computer System Design & Architecture” (A.W.L.)
- William Stalling, “Computer Organization & Architecture”, Pearson Education Asia.
- V. Carl Hamacher , “Computer Organization”, TMH
- Tannenbaum, “Structured Computer Organization”, PHI .

Suggestive digital platform web links :

<https://www.youtube.com/watch?v=4TzMyXmzL8M>

<https://nptel.ac.in/courses/106/106/106106166/>

<https://nptel.ac.in/courses/106/106/106106134/>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105163/>

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : **25 Marks**
Shall be based on allotted assignments and Class Tests. The marks shall be as follows:

External Assessment: University Exam (UE) : **75 Marks**
Time : **02.00 Hours**

Assessment and presentation of assignment	10 Marks	Section (A) : Three Very Short Questions (50 Words Each)	03 x 03 = 09 Marks
Class Test I (Objective Questions)	5 Marks	OR Nine MCQ Questions	OR 09 x 01 = 09 Marks
Class Test II (Descriptive Questions)	5 Marks	Section (B) : Four Short Questions (200 Words Each)	04 x 09 = 36 Marks
Class Test III (Based on solving circuit design problems)	5 Marks	Section (C): Two Long Questions (500 Words Each)	02 x 15 = 30 Marks
Total	25 Marks	Total	75 Marks

Any remarks/suggestions: Learnings in the course should be emphasised more on practical aspects and real world problems and their solutions.



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PART A: Introduction			
Program: Certificate		Class: B.Sc.	Year: I Year
Session: 2021-22			
Subject: Computer Science			
1.	Course Code	S1-COSC1P	
2.	Course Title	Computer Architecture Lab (Paper I)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course	
4.	Pre-Requisite (if any)	To study this course, a student must have had the subject Physics/Maths in 12 th class.	
5.	Course Learning Outcomes(CLO)	On completion of this course, learners will be able to: <ol style="list-style-type: none"> 1. Realization of the basic logic and universal gates. 2. Verify the behavior of logic gates using truth tables. 3. Implement Binary-to -Gray, Gray-to -Binary code conversions 4. Design half and full adder circuit using basic gates. 5. Design and construct flip flops and verify the excitation tables. 	
6.	Credit Value	Practical - 2 Credits	
7.	Total Marks	Max. Marks : 25+75	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 2 Hrs. per week			
Total No. of Labs: 07 30 Hrs			
	Suggestive list of Practicals		No. of Labs.
	<ol style="list-style-type: none"> 1. To study basic gates (AND, OR, NOT) and verify their truth tables. 2. To convert a given binary number to Gray code using IC 7486. 3. To study and verify NAND as Universal gate using IC 7400. 4. To study half adder using basic gates and verify its truth table. 5. To study Full Adder using basic gates and verify its truth table. 6. To realize basic gates (AND, OR, NOT) from Universal gates (NAND and NOR). 7. To verify truth table of 4-bit adder using IC 7483. 8. To design and construct RS flip Flop using gates and verify the truth table. 9. To design and construct JK flip Flop using gates and verify the truth table. 10. To verify DeMorgan's Theorem. 		


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Keywords/Tags: Digital Electronics, Logic Gates, AND, OR, NOT, IC 7486, IC 7400, NAND, NOR, IC 7483, Circuits, Flip Flop, DeMorgan's Theorem

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

- M.Morris Mano, "Computer System Architecture", PHI.
- Heuring Jordan , "Computer System Design & Architecture" (A.W.L.)
- William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
- V. Carl Hamacher , "Computer Organization", TMH
- Tannenbaum, "Structured Computer Organization", PHI .

Suggestive digital platform web links :

<https://www.youtube.com/watch?v=4TzMyXmzL8M>

<https://nptel.ac.in/courses/106/106/106106166/>

<https://nptel.ac.in/courses/106/106/106106134/>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105163/>

PART D: Assessment and Evaluation

Internal Assessment : Continuous
Comprehensive Evaluation (CCE) : **25 Marks**

External Assessment: University Exam (UE) : **75 Marks**
Time : **02.00 Hours**

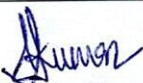
Internal Assessment	Marks	External Assessment	Marks
Hands-on Lab Practice	5 Marks	Practical record file	10 Marks
Lab Test from practical list & internal viva	12 Marks	Viva voce on practical	15 Marks
Assignments (Charts/ Model/ Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	8 Marks	Table works/ Experiments	50 Marks
Total	25 Marks	Total	75 Marks

Any remarks/suggestions: Learnings in the course should be emphasised more on real world problems and their solutions.



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PART A: Introduction			
Program: Certificate		Class: B.Sc.	Year: I Year
Session: 2021-22			
Subject: Computer Science			
1.	Course Code	S1-COSC2T	
2.	Course Title	Programming Methodologies & Data Structures (Paper 2)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course	
4.	Pre-Requisite (if any)	To study this course, a student must have had the subject Physics/Maths in 12 th class.	
5.	Course Learning Outcomes(CLO)	<p>On completion of this course, learners will be able to:</p> <ol style="list-style-type: none"> 1. Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. 2. Writing efficient and well-structured computer algorithms/programs. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Use recursive techniques, pointers and searching methods in programming. 5. Will be familiar with fundamental data structures , their implementation; become accustomed to the description of algorithms in both functional and procedural styles 6. Have knowledge of complexity of basic operations like insert, delete, search on these data structures. 7. Possess ability to choose a data structure to suitably model any data used in computer applications. 8. Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc. 9. Assess efficiency tradeoffs among different data structure implementations. 10. Implement and know the applications of algorithms for searching and sorting etc. 11. Know the contributions of Indians in the field of programming and data structures. 	
6.	Credit Value	Theory – 4 Credits	
7.	Total Marks	Max. Marks : 25+75	Min. Passing Marks: 33


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PART B: Content of the Course		
No. of Lectures (in hours per week): 2 Hrs. per week		
Total No. of Lectures: 60 Hrs.		
Module	Topics	No. of Lectures
I	<p>Introduction to Programming - Program Concept, Characteristics of Programming, Stages in Program Development, Algorithms, Notations, Design, Flowcharts, Types of Programming Methodologies.</p> <p>Introduction to C++ Programming - Basic Program Structure In C++, Data Types, Variables, Constants, Operators and Basic I/O .</p> <p>Variables - Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putchar etc.), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.h etc.)</p> <p>Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions</p> <p>Conditional Statements if construct, switch-case construct.</p>	8
II	<p>Iterative Statements while, do-while, and for loops, Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)</p> <p>Functions Top-Down Design, Pre-defined Functions, Programmer – defined Functions, Local Variables and Global variables, Functions with Default Arguments, Call-By-Value and Call-By-Reference Parameters, Recursion.</p> <p>Introduction to Arrays - Declaration and Referring Arrays, Arrays in Memory, Initializing Arrays. Arrays in Functions, Multi-Dimensional Arrays.</p>	10
III	<p>Structures - Member Accessing, Pointers to Structures, Structures and Functions, Arrays of Structures.</p> <p>Unions - Declaration and Initialization.</p> <p>Strings - Reading and Writing Strings, Arrays of Strings, String and Function, Strings and Structure, Standard String Library Functions.</p> <p>Searching Algorithms - Linear Search, Binary Search.</p> <p>File Handling - Use of files for data input and output, merging and copying files.</p>	8
IV	<p>Data Structure - Basic concepts, Linear and Non-Linear data structures</p>	12



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	<p>Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis.</p> <p>Linked List - Singly Linked Lists, Operations, Concatenating, circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations.</p> <p>Array - Representation of single, two dimensional arrays, sparse matrices-array and linked representations.</p> <p>Stack- Operations, Array and Linked Implementations, Applications- Infix to Postfix Conversion, Postfix Expression Evaluation, Recursion Implementation.</p>	
V	<p>Queue- Definition, Operations, Array and Linked Implementations. Circular Queue-Insertion and Deletion Operations, Dequeue (Double Ended Queue), Priority Queue- Implementation.</p> <p>Trees - Representation of Trees, Binary tree, Properties of Binary Trees, Binary Tree Representations- Array and Linked Representations, Binary Tree Traversals, Threaded Binary Trees.</p> <p>Heap- Definition, Insertion, Deletion.</p>	10
VI	<p>Graphs - Graph ADT, Graph Representations, Graph Traversals, Searching.</p> <p>Hashing- Introduction, Hash tables, Hash functions, Overflow Handling.</p> <p>Sorting Methods, Comparison of Sorting Methods,</p> <p>Search Trees - Binary Search Trees, AVL Trees- Definition and Examples.</p>	10
VII	<p>Indian Contribution to the field : Innovations in India, origin of Julia Programming Language, Indian Engineers who designed new programming languages, open source languages, Dr. Sartaj Sahni – computer scientist - pioneer of data structures, Other relevant contributors and contributions.</p>	2

Keywords/Tags: Programming, C++, Data Structures, Expressions, Control, File Handling, Arrays, Stack, Queue, Linked List, Tree, Graph, Structure, Union, Hash, Search, Sort, Algorithm

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

- Lipschutz: Schaum's outline series Data structures, Tata McGraw-Hill
- Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, Pearson, 2015
- E. Balguruswamy, "C++ " TMH Publication ISBN O-07-462038-X
- Herbertz Shield, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
- R. Lafore, 'Object Oriented Programming C++'



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- N. Dale and C. Weems, Programming and problem solving with C++: brief edition, Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- Sartaj Sahani, Data Structures, Algorithms and Applications with C++, McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, Data Structure using C++, Second edition, Cengage Learning.
- M. A. Weiss, Data structures and Algorithm Analysis in C, 2nd edition, Pearson.

Suggestive digital platform web links :

<https://www.youtube.com/watch?v=BCIS40yzssA>

<https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en>

<https://www.youtube.com/watch?v=Umm1ZQ5ltZw>

https://www.youtube.com/watch?v=AT14ICXuMKI&list=PLdo5W4Nhv31bbKJzrsKfMpo_grxuL18LU

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105151/>

<https://nptel.ac.in/courses/106/106/106106133/>

PART D: Assessment and Evaluation

Internal Assessment : Continuous

Comprehensive Evaluation (CCE) : **25 Marks**

Shall be based on allotted assignments and Class Tests. The marks shall be as follows:

External Assessment: University Exam (UE) : **75 Marks**

Time : **02.00 Hours**

Assessment and presentation of assignment

10 Marks

Section (A) : Three Very Short Questions (50 Words Each)

03 x 03 = 09 Marks

OR

Class Test I (**Objective Questions**)

5 Marks

OR
Nine MCQ Questions

01 x 09 = 09 Marks

Class Test II (**Descriptive Questions**)

5 Marks

Section (B) : Four Short Questions (200 Words Each)

04 x 09 = 36 Marks

Class Test III (**Based on solving programming problems**)

5 Marks

Section (C): Two Long Questions (500 Words Each)

02 x 15 = 30 Marks

Total

25 Marks

Total

75 Marks

Any remarks/suggestions: **Focus of the course/teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.**



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PART A: Introduction			
Program: Certificate		Class: B.Sc.	Year: I Year
Session: 2021-22			
Subject: Computer Science			
1.	Course Code	S1-COSC2P	
2.	Course Title	Office Tools & Programming Methodology Lab (Paper 2)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course	
4.	Pre-Requisite (if any)	To study this course, a student must have had the subject Physics/Maths in 12 th class.	
5.	Course Learning Outcomes(CLO)	<p>On completion of this course, learners will be able to:</p> <ol style="list-style-type: none"> 1. Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. 2. Writing efficient and well-structured computer algorithms/programs. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Use recursive techniques, pointers and searching methods in programming. 5. Possess ability to choose a data structure to suitably model any data used in computer applications. 6. Implementation of algorithms for searching and sorting. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks : 25+75	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lab Practicals (in hours per week): 2 Hrs per week			
Total No. of Lab.: 30 Hrs			
Suggestive list of Practicals			No. of Labs.
I. Office Tools <ol style="list-style-type: none"> a. Using a Text Editor Tool <ol style="list-style-type: none"> 1. Create a document and apply different Editing options. 2. Create Banner for your college. 3. Design a Greeting Card using Word Art for different festivals. 4. Design your Bio data and use page borders and shading. 			30 Hrs.


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5. Create a document and insert header and footer, page title, date, time, apply various page formatting features etc.
6. Implement Mail Merge.
7. Insert a table into a document and try different formatting options for the table.

b. Using a Spreadsheet Tool

1. Design your class Time Table.
2. Prepare a Mark Sheet of your class result.
3. Prepare a Salary Slip of an employee of an organization.
4. Prepare a bar chart & pie chart for analysis of Election Results.
5. Prepare a generic Bill of a Super Market.
6. Work on the following exercises on a Workbook:
 - a. Copy an existing Sheet
 - b. Rename the old Sheet
 - c. Insert a new Sheet into an existing Workbook
 - d. Delete the renamed Sheet.
7. Prepare an Attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student & average of attendance.
8. Create a worksheet of Students list of any 4 faculties and perform following database functions on it.
 - a. Sort data by Name
 - b. Filter data by Class
 - c. Subtotal of no. of students by Class.

c. Using a Presentation Tool

1. Design a presentation of your institute using auto content wizard, design template and blank presentation.
2. Design a presentation illustrating insertion of pictures, Word Art and ClipArt.
3. Design a presentation, learn how to save it in different formats, copying and opening an existing presentation.
4. Design a presentation illustrating insertion of movie, animation and sound.
5. Illustrate use of custom animation and slide transition (using different effects).



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6. Design a presentation using charts and tables of the marks obtained in class.

II. Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code in C++, execute and test it. Students should be given assignments on following :

1. a. To learn elementary techniques involving arithmetic operators and mathematical expressions, appropriate use of selection (if, switch, conditional operators) and control structures
b. Learn how to use functions and parameter passing in functions, writing recursive programs.
2. Write a program to swap the contents of two variables.
3. Write a program for finding the roots of a Quadratic Equation.
4. Write a program to find area of a circle, rectangle, square using switch case.
5. Write a program to check whether a given number is even or odd.
6. Write a program to print table of any number.
7. Write a program to print Fibonacci series.
8. Write a program to find factorial of a given number.
9. Write a program to convert decimal (integer) number into equivalent binary number.
10. Write a program to check given string is palindrome or not.
11. Write a program to perform multiplications of two matrices.
12. Write a program to print digits of entered number in reverse order.
13. Write a program to print sum of two matrices.
14. Write a program to print multiplication of two matrices.
15. Write a program to generate even/odd series from 1 to 100.
16. Write a program whether a given number is prime or not.
17. Write a program for call by value and call by reference.
18. Write a program to generate a series $1+1/1!+2/2!+3/3!+-----$
 $---+n/n!$
19. Write a program to create a pyramid structure
*
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20. Write a program to create a pyramid structure

	<p>1 12 123 1234</p> <p>21. Write a program to check entered number is Armstrong or not. 22. Write a program for traversing an Array. 23. Write a program to input N numbers, add them and find average. 24. Write a program to find largest element from an array. 25. Write a program for Linear search. 26. Write a program for Binary search. 27. Write a program for Bubble sort. 28. Write a program for Selection sort.</p>	
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Keywords/Tags: Programming, C++, Data Structures, if, else, for, while, do, File Handling, call by value, call by reference, recursion, Arrays, Union, Hash, Linear search, Binary search, Bubble sort, Selection sort.

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

- Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, Pearson, 2015
- E. Balguruswamy, "C++ " TMH Publication ISBN O-07-462038-X
- Hertzberg, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
- R. Lafore, 'Object Oriented Programming C++'
- N. Dale and C. Weems, Programming and problem solving with C++: brief edition, Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- Sartaj Sahani, Data Structures, Algorithms and Applications with C++, McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, Data Structure using C++, Second edition, Cengage Learning.
- M. A. Weiss, Data structures and Algorithm Analysis in C, 2nd edition, Pearson.
- Lipschutz: Schaum's outline series Data structures, Tata McGraw-Hill

Suggestive digital platform web links :

- <https://www.youtube.com/watch?v=BCIS40yzssA>
- <https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en>
- <https://www.youtube.com/watch?v=Umm1ZQ5ltZw>
- <https://nptel.ac.in/courses/106/106/106106127/>

Suggested equivalent online courses

- <https://nptel.ac.in/courses/106/105/106105151/>
- <https://nptel.ac.in/courses/106/105/106105171/>
- https://onlinecourses.swayam2.ac.in/cec19_mg35/preview



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PART D: Assessment and Evaluation			
Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 25 Marks		External Assessment: University Exam (UE) : 75 Marks Time : 02.00 Hours	
Internal Assessment	Marks	External Assessment	Marks
Hands-on Lab Practice	5 Marks	Practical record file	10 Marks
Lab Test from practical list & internal viva	12 Marks	Viva voce on practical	15 Marks
Assignments (Charts/ Model/ Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	8 Marks	Table works/ Experiments	50 Marks
Total	25 Marks	Total	75 Marks
Any remarks/suggestions: Focus of the course/teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.			


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PART A: Introduction			
Program: Diploma	Class: B.Sc.	Year: II Year	Session: 2022-23
Subject: Computer Science			
1.	Course Code	S2-COSC1T	
2.	Course Title	Computer Networks & Information Security	
3.	Course Type (Core Course/ Elective/ Generic Elective/ Vocational)	Core Course -(Major – I)	
4.	Pre-Requisite (if any)	NIL	
5.	Course Learning Outcomes (CLO)	<p>After completing this course student will be able to:</p> <ol style="list-style-type: none"> 1. Define and describe the components of Data Communications System such as various protocols, OSI Model, data transmission in analog and digital format. 2. Identify and differentiate among the network devices and drivers. 3. Learn and describe various error detection and correction methods. Define the various terminologies used in Network and Application layers. 4. Compare the various network technologies and can decide the suitable technology installation as per requirement and environment at any work place. 5. Describe the various protocols and can identify the application areas of each protocol. 6. Know the fundamentals of network and information security issues, laws, and various security technologies which can be applied on work place. 	
6.	Credit Value	Theory – 4 Credits Practical – 2 Credits	
7.	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Hrs. per week			
Total No. of Lectures (in hours): 60 Hrs.			
Module	Topics	No. of Lectures	
I	<p>Introduction to Computer Network: Use of computer network: Access to information, person to person communication, electronic commerce, internet of things; Types of computer network: Broadband access network, Mobile and wireless network, content delivery network, transit network, Enterprise network. Network Technology: Personal Area Network, Local Area Network,</p>	8	

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	<p>Metropolitan Area Network, Wide Area Network, internetworks, example of network (Internet, Mobile network, wireless network-Wi-Fi);</p> <p>Reference Model: OSI, TCP/IP, Critique of the OSI and TCP/IP reference models;</p> <p>Policy, Legal & Social Issues: Online speech, net neutrality, security & privacy, disinformation.</p> <p>Keywords: IoT, Broadband, LAN, MAN, WAN, OSI, TCP/IP.</p>	
II	<p>Physical Layer:</p> <p>Guided Transmission Media: Twisted pairs, coaxial cable, Fiber Optics;</p> <p>Wireless Transmission: The electromagnetic spectrum, frequency hopping spread spectrum, direct sequence, spread spectrum, ultra-wideband communication;</p> <p>Cellular Network: Common concepts – cells, handoff, paging, 1G, 2G, 3G, 4G & 5G technology.</p> <p>Keywords: Coaxial cable, fiber optics, 2G, 3G, 4G, 5G.</p>	8
III	<p>Data Link Layer:</p> <p>Service Provided to Network Layer: Data Link Control: Framing, Flow and Error Control; Error detecting codes, Error correcting codes;</p> <p>Data Link Protocols: Basic transmission and receipt, simplex link layer protocol, Full duplex, Sliding window protocol, Packet over SONET, ADSL, Point-to-Point Protocol.</p> <p>Switching Techniques: Packet Switching, Circuit Switching, Datagram Networks, Virtual-Circuit Networks, and Structure of a Switch.</p> <p>Network Devices & Drivers: Router, Modem, Repeater, Hub, Switch, Bridge and Gateways (fundamental concepts).</p> <p>Keywords: error correcting codes, error detecting codes, SONET, ADSL, point -to-point protocol, Router, Modem, Repeater, Hub, Switch, Bridge, Gateways.</p>	12
IV	<p>Network Layer:</p> <p>Network Layer Issues, Routing Algorithm: Optimality, principle of shortest path algorithm, Flooding, Distance Vector Routing, Broadcast Routing; congestion in network, traffic management approaches; IP Addresses, IPv4 Addresses, IPv6 Addresses,</p> <p>Virtual-Circuit Networks: Frame Relay and ATM,</p> <p>Transport Layer: Process-Process Delivery: UDP, TCP.</p> <p>Application layers: DNS, SMTP, POP, ftp, http and https.</p> <p>Basics of Wi-Fi (Fundamental concepts only).</p> <p>Streaming audio and video: digital audio and video, streaming stored media, real-time streaming.</p> <p>Keywords: routing algorithm, IPv4, IPv6, ATM, SMTP, POP, ftp, http, https, WiFi, video streaming.</p>	12
V	<p>Network Security and Information Security: Fundamentals of network and information security: principles of security and attack. Security Goals (Confidentiality, Integrity, and Availability), Non-Repudiation.</p> <p>Overview of Security Threats and Vulnerability: Types of attacks on</p>	10

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	<p>Confidentiality, Integrity and Availability. Vulnerability and Threats: Phishing Attacks, E-mail threats, Web-threats; Intruders and Hackers, Insider threats, SQL injection Attacks, Ransomware. Malware: Worms, Virus, Spams, Adware, Spyware, Trojans.</p> <p>Security Technology: Firewalls, Intrusion detection and prevention systems, Scanning and Analysis Tools: Biometric access controls, Cipher methods, Cryptographic algorithms, Cryptographic tools, Protocols for secure communication.</p> <p>Keywords: phishing, SQL injection, Worms, Computer virus, Spyware, Trojans, Firewall, Cipher, Cryptography.</p>	
VI	<p>Computer and Cyber-crimes: Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes, cyber stalking, forgery and fraud, crime related to IPRs, cyber terrorism, Ransom ware attacks, computer vandalism.</p> <p>Cyber Laws- Introduction to IT laws & Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy, Intellectual property, Legal System of Information Technology, Social Engineering, Mail Bombs, Bug Exploits. Scope of cyber laws: e-commerce, online contracts, IPRs (copyright, trademarks and software patenting), e-taxation, e-governance and cyber-crimes, Cyber law in India with special reference to Information Technology Act, 2000 and Recent amendments.</p> <p>Keywords: cyber-crime, cyber stalking, cyber-fraud, IPR, IT laws, e-commerce, e-taxation, e-governance, mail bombs.</p>	10

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- Andrew S. Tanenbaum, Nick Feamster, David J. Wetherall, Computer Networks, 6th Edition, (2021), Pearson.
- Michael E Whitman and Herbert J Mattord, Principles of Information Security, Fourth Edition, CENGAGE Learning, 6th Indian Reprint.
- M. Merkow, J. Breithaupt, Information Security Principles and Practices, 2nd Edition, 2014, Pearson Education.
- G.R.F. Snyder, T. Pardoe, Network Security, Cengage Learning.
- Praveen Kumar Shukla, Surya Prakash Tripathi, Ritendra Goel "Introduction to Information Security and Cyber Laws", 2014, Dreamtech Press.
- Faiyaz Ahamad, KLSI "Cyber Law and Information Security", 2013, Dreamtech Press.
- Books published by M.P. Hindi Granth Academy, Bhopal

Reference books:

- Kurose James F., Ross Keith W., Computer Networking, A Top-Down Approach, Sixth Edition, 2017, Pearson
- Micki Krause, Harold F. Tipton, Handbook of Information Security Management, Vol. 1-3, CRC Press LLC.
- B. A. Forouzan: Data Communications and Networking, Fourth edition, TMH Publishing

Abhilasha

Company Ltd.

- Basta, W.Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India.

Suggestive digital platform web links

1. <https://www.youtube.com/watch?v=qiQR5rTSshw>
2. Free CCNA | Network Fundamentals - Day 1 (<https://www.youtube.com/watch?v=n2D1o-aM-2s>)
3. Free CCNA | Network Devices <https://www.youtube.com/watch?v=H8W9oMNSuwo>
4. Free CCNA | OSI Model & TCP/IP Suite (<https://www.youtube.com/watch?v=t-ai8JzhHuY>)
5. Free CCNA | Interfaces and Cables | Day3 (<https://www.youtube.com/watch?v=ieTH5IVhNaY>)
6. Free CCNA | Intro to the CLI | Day 4 (<https://www.youtube.com/watch?v=IYbtai7Nu2g>)
7. Free CCNA | Ethernet LAN Switching (Part 1) | Day 5 (<https://www.youtube.com/watch?v=u2n762WG0Vo>)
8. Free CCNA | Analyzing Ethernet Switching | Day 6 Lab (<https://www.youtube.com/watch?v=Ig0dSaOODI8>)
9. Free CCNA | IPv4 Addressing (Part 1) | Day7 (<https://www.youtube.com/watch?v=3ROdsfEUuhs>)
10. Free CCNA | IPv6 Part 1 | Day 31 (<https://www.youtube.com/watch?v=ZNuXyOXae5U>)
11. Free CCNA | IPv6 Part 3 | Day 33 (<https://www.youtube.com/watch?v=rwkHfsWQwy8>)
12. <http://www.mphindigranthacademy.org/>

Suggested equivalent online courses

NPTEL:

1. Demystifying Networking (04 weeks)
2. Cyber Security (15 Weeks)
3. <https://www.edx.org/learn/computer-networking>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks : 100

Continuous Comprehensive Evaluation (CCE) : 30 marks University Exam (UE) : 70marks

Internal Assessment : Continuous Comprehensive Evaluation (CCE):30	Class Test Assignment/Presentation	Total 30
External Assessment : University Exam Section: 70 Time : 03.00 Hours	Section(A) : Objective Questions Section (B) : Short Questions Section (C) : Long Questions	Total 70

Abhilasha Kumar
Chairman, Central Board of Studies, Computer Science

PART A: Introduction			
Program: Diploma		Class: B.Sc.	Year: Second
Session: 2022-23			
Subject: Computer Science			
1.	Course Code	S2-COSC1P	
2.	Course Title	Computer Networks Lab	
3.	Course Type (Core Course/ Elective/ Generic Elective/ Vocational)	Core Course - (Major – I)	
4.	Pre-Requisite (if any)	Open for all	
5.	Course Learning Outcomes (CLO)	<p>After completing this lab course, students will be able to:</p> <ol style="list-style-type: none"> 1. Learn and identify various cables used in the networking. 2. Learn, identify various connectors used to connect different cables. 3. Use the various tools for preparing the connectors for cables. 4. Configure and manage various local area networks at home and at work place. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks: 100	Min. Passing Marks: 33
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 1 Hr. per week			
Total No. of Labs: 30 Hrs.			
Suggestive List of Practicals			No. of Labs.
<ol style="list-style-type: none"> 1. Study of UTP network cable <ul style="list-style-type: none"> ○ Study the color code of UTP cable ○ Categories of UTP n/w cable ○ Shielding of n/w cable ○ Electricity interference with n/w cable ○ Maximum length for which data cable can be used ○ Crimping of RJ45 connector and Punching of data n/w cable ○ Penta scanning of cabling work ○ Rules of UTP laying 2. Knowledge of Structured Cabling and its components <ul style="list-style-type: none"> ○ Information outlet with box ○ Network Rack (4U, 6U, 9U, 12U, 24U, 32U, 42U) ○ Patch Panel ○ Rack Management 3. Study of Optical Fiber cable 			30



- Different cores of OFC (6 core, 12, 24 core)
- Multimode & Single mode OFC cable
- Shielding of OFC
- Splicing/Termination of OFC.
- OTDR Testing
- LIU fixing
- LIU management (pigtail/fiber patchcord)
- Media Convertor
- SFP module
- Rules of OFC laying

4. Use of tools

- Crimping Tool
- Punching Tool
- Nose plier
- Wire Stripping and Cable Cutter
- Multimeter
- RJ45 RJ11 RJ12 Cat5 Cat6 Network Cable Tester
- In-Line Coupler (RJ45 F/F)
- RJ45 NETWORK SPLITTER-ADAPTER 2-way.

5. Configuration/ Management of Local Area Network

- Implementation of file and printer sharing.
- Installation of ftp server and client.
- Connect the computers in Local Area Network.
- Configuring Class A IP Address on LAN Connection in Computer LAB and then use following tools:
ping, ipconfig, getmac, hostname, nslookup, tracert, arp, pathping, systeminfo.
- Configure static routing using packet tracer software
- Configure Dynamic routing using packet tracer
- Configure VLAN using Managed switch Device / Packet tracer
- Implementation of Subnetting in Class A, B and C
- Ping between 2 systems using IPv6
- Configuration of NAT for incoming packet request
- Configuration of Software / Hardware firewall to block outgoing requests to facebook.com

Abhilasha

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- Andrew S. Tanenbaum, Nick Feamster, David J. Wetherall, Computer Networks, 6th Edition, (2021), Pearson.
- Michael E Whitman and Herbert J Mattord, Principles of Information Security, Fourth Edition, CENGAGE Learning, 6th Indian Reprint.
- Books published by M.P. Hindi Granth Academy, Bhopal

Reference books:

- Hacking Exposed, Stuart McClure, Joel Scrambray, George Kurtz, TMH.
- Computer Security Art and Science, Matt Bishop, Pearson/PHI.

Suggestive digital platform web links

<https://www.edx.org/learn/computer-networking>
<http://www.mphindigranthacademy.org/>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105081/>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz		Viva Voce on Practical	
Attendance		Practical Record File	
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)		Table work / Experiments	
TOTAL	30		70



PART A: Introduction			
Program: Diploma		Class: B.Sc.	Year: II Year
Session: 2022-23			
Subject: Computer Science			
1.	Course Code	S2-COSC2T	
2.	Course Title	Object Oriented Programming with Java	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course – (Major – II) / Minor / Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.	
5.	Course Learning Outcomes(CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem. 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events. 6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture. 	
6.	Credit Value	Theory - 4 Credits Practical – 2 Credits	
7.	Total Marks	Max. Marks : 30+70	Min. Passing Marks: 33



PART B: Content of the CourseNo. of Lectures (in hours per week): **2 Hrs. per week**Total No. of Lectures: **60 Hrs.**

Module	Topics	No. of Lectures
I	<p>OOPS - Object Oriented Paradigm, Benefits of OOP, Applications of OOP.</p> <p>Java - History, Java Features, How Java Differs from C and C++, Java and internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Supports Systems, Java Environment.</p> <p>Java Program Structure - Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, and Programming Style.</p> <p>Keywords: OOPS, JVC, WWW, Java Environment</p>	12
II	<p>Java Basics - Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variable, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values.</p> <p>Operators - Arithmetic Operator, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators.</p> <p>Arithmetic Expressions - Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions. Decision Making with if Statement, Simple if Statement, if.....Else Statement, Nesting of if ...else Statement, if-else Ladder, The Switch Statement, The ? Operator.</p> <p>Loops - While Statement, Do Statement, For Statement, Jump in Loops, Labeled Loops.</p> <p>Keywords: Operators, Arithmetic Expressions, Decision Making, Loops</p>	12
III	<p>Class - Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members,</p> <p>Constructors – definition and types, Methods Overloading, Static Members, Nesting of Methods.</p> <p>Inheritance - Extending a Class, Overloading Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control Arrays, One Dimensional Array, Strings, Vectors, Wrapper Classes. Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.</p> <p>Keywords: Class, Constructors, Inheritance, Final, Abstract Methods,</p>	12



	Overloading	
IV	<p>Java API Packages - Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, and Hiding Classes. Creating Threads, Extending the Thread Class, Stopping and Blocking a Threads, Life Cycle of a Thread, Using Threads Methods, Threads Exceptions, Threads Priority, Synchronization, Implementing the 'Runnable' interface.</p> <p>Types of Errors - Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statements, Throwing Our Own Exceptions, Using Exceptions for Debugging.</p> <p>Preparing to Write Applets - Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet.</p> <p>Keywords: API, threads, synchronization, errors, Applets, debugging</p>	12
V	<p>More About the Applet tag - Passing Parameters to Applets, Aligning the Display, More About HTML Tags, Displaying Numbering Values, Getting Input from the user.</p> <p>The Graphics Class - Lines and Rectangles, Circles and Ellipses, Drawing Arcs, Drawing Polygons, Line Graphs, Using Control Loops in Applets, Drawing Bar Charts.</p> <p>Concept of Stream - Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams,</p> <p>Other Useful I/O Classes - Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Random Access, Files, Interactive Input and Output, other Stream Classes.</p> <p>Keywords: Stream, files, Graphics class, buffering, HTML tags</p>	12



PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks -

- E Balguruswami, Programming with Java, Tata McGraw-Hill Publication.

Reference Books -

- Bruce Eckel, Thinking in Java.
- Herbert Schildt, Java: The Complete Reference .
- Y. Daniel Liang, Introduction to Java Programming .
- Paul Deitel, Harvey Deitel, Java: How To Program .
- Cay S. Horstmann, Core Java Volume I –Fundamentals .
- Java Projects, BPB Publication.
- Dr. S.S. Kandare, Programming in Java, S Chand Publication .
- Books published by M.P. Hindi Granth Academy, Bhopal

Suggestive digital platform web links

<https://www.cs.cmu.edu/afs/cs.cmu.edu/user/gchen/www/download/java/LearnJava.pdf>

https://www.tutorialspoint.com/java/java_tutorial.pdf

<https://www.youtube.com/watch?v=7s3xDfdqfDw>

<http://www.mphindigranthacademy.org/>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105191/>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks :100

Continuous Comprehensive Evaluation (CCE) : 30marks University Exam (UE) 70marks

Internal Assessment : Continuous Comprehensive Evaluation (CCE):30	Class Test Assignment/Presentation	
External Assessment : University Exam Section: 70 Time : 03.00 Hours	Section(A) : Objective Questions Section (B) : Short Questions Section (C) : Long Questions	Total 70

AKumar

PART A: Introduction			
Program: Diploma		Class: B.Sc.	Year: II Year
Session: 2022-23			
Subject: Computer Science			
1.	Course Code	S2-COSC2P	
2.	Course Title	Java Programming Lab	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course - (Major- II) / Minor / Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.	
5.	Course Learning Outcomes(CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Implement Object-Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem. 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events. 6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 33



PART B: Content of the Course		
No. of Lab. Practicals (in hours per week): 1 Hr. per week		
Total No. of Lab.: 30 Hrs.		
	Suggestive List of Practicals	No. of Labs.
	<p style="text-align: center;">(Using any Text editor: Notepad/Eclipse/Netbeans/Sublime etc.)</p> <ol style="list-style-type: none"> 1. Find greater number between two numbers -using conditional operator. 2. Find the factorial of number if number is given by user using command line argument. 3. Write a program to check if a number is prime or not. 4. Write a program to display tables from 2 to 10. 5. Write a program to print Fibonacci series. 6. Enter a no. and check whether it is even or odd. 7. Write a Program to find sum & average of 10 no. using arrays. 8. Write a program to display reverse of a digit no. using array. 9. Write a program to demonstrate function overloading. 10. Write a program to display grade according to the marks obtained by the student. 11. Write a program to calculate the salary of an employee if salary is greater than or equal to 20000 and year of service is greater than or equal to 5 years then bonus will be 2000 otherwise 1000 and print gross salary of employee. 12. Write a program to convert the given no. of days into months & days using with classes, objects and method. 13. Write a program to convert given string into Uppercase and lowercase and get the length of string using array. 14. Create a package called "Arithmetic" that contains methods to deal all arithmetic operations. Also write a program to use the package. 15. Write a program to demonstrate use of constructor and destructor. 16. Define an exception called "Marks out of Bound" exception that is thrown if the entered marks are greater than 100. 17. Write a program using application of single inheritance. Find the area of rectangle & volume of cube. 18. Develop a simple real life application to illustrate the use of multithreading. 19. Write a program using multiple inheritance to calculate area and perimeter of a circle using interface. 20. Write an applet program to draw a Rectangle (color = orange) and a 	30



	<p>right aligned oval.</p> <p>21. Develop an applet that receives 3 numeric values as inputs from the user and then displays the largest no. on the screen.</p> <p>22. Write a Java Program to read data from the inputted text file name, and print its content on the console.</p> <p>23. Write a Java Program to merge two files into third file</p> <p>24. Write a Java program to delete duplicate lines in text file</p> <p>25. Write a Java Program to implement FileInputStream class to read binary data from any image file.</p>	
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		
Suggested Readings		
<p>Textbooks -</p> <ul style="list-style-type: none"> ● E Balguruswami, Programming with Java, Tata McGraw-Hill Publication, 2nd Edition ● Books published by M.P. Hindi Granth Academy, Bhopal <p>Reference Books -</p> <ul style="list-style-type: none"> ● Bruce Eckel, Thinking in Java (4e) ● Herbert Schildt, Java: The Complete Reference (9e) ● Y. Daniel Liang, Introduction to Java Programming (10e) ● Paul Deitel, Harvey Deitel, Java: How To Program (10e) ● Cay S. Horstmann, Core Java Volume I - Fundamentals (10e) ● Java Projects, BPB Publication. ● Dr. S.S. Kandare, Programming in Java, S Chand Publication 		
Suggestive digital platform web links		
https://www.cs.cmu.edu/afs/cs.cmu.edu/user/gchen/www/download/java/LearnJava.pdf		
https://www.tutorialspoint.com/java/java_tutorial.pdf		
https://www.youtube.com/watch?v=7s3xDfdqfDw		
http://www.mphindigranthacademy.org/		
Suggested equivalent online courses		
https://nptel.ac.in/courses/106/105/106105191/		



Part D-Assessment and Evaluation			
Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz		Viva Voce on Practical	
Attendance		Practical Record File	
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)		Table work / Experiments	
TOTAL	30		70

Higher Education

AKumar

B.Sc. III Year
Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. III YEAR COMPUTER SCIENCE
PAPER I: DATABASE MANAGEMENT SYSTEM

Max. Marks : 42.5

Min. Marks:15

UNIT-I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:-DDL, DML, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:-external, conceptual & internal levels.

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship and relationship set, attributes and mapping constraints, keys, ER diagram:-strong and weak entities, generalization, specialization & aggregation, reducing ER diagram to tables

UNIT-III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity ,extension and intention, relational algebra: select, project, cartesian product, different types of joins: theta, equi, natural, outer joins, set operations.

UNIT-IV

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF &BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF.

UNIT-V

Basic concepts: -Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses.

Text Books-

Database System Concepts by Henry Korth and A. Silberschatz.
Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication

Reference Books-

An Introduction to Database System by Bipin Desai
An Introduction to Database System by C.J.Date.

R.K. Kataria
28-4-2017

Rajput
28-4-17

Sharma
28.4.17

(Anubhai)
28-4-17

Rajendra
28.4.17

(P. S. Yadav)

Chandel
28.4.17

Sharma
28/4/17

10 | *Anurag*
28/4/17

Arora
28/4/17

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.
15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation'. Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'newsalary'
24. List the employee number of employee who belone to department 10,20.
25. List the employe no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two 'aa' in the name
29. Print the name , emp no, sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

R.K. Kateri
28-4-2017

Chandru
28-4-17

Chandru
28-4-17
28/4/17
28-4-17

Rajendra

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.

Session 2017-18

B.Sc. III YEAR COMPUTER SCIENCE
PAPER II: OPERATING SYSTEM CONCEPTS

Max. Marks : 42.5

Min. Marks:15

UNIT I

Operating system definitions, its components, evolution of operating system, types of operating systems: batch, multiprogramming, multitasking, multiprocessor, real time, client-server, peer-to-peer, distributed, clustered, operating system services, system calls, protection of I/O, memory and CPU.

UNIT II

Process scheduling: concept of a process, process states, PCB, process life cycle, operations on processes, context switch, types of schedulers, CPU burst- I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue. Performance evaluation of algorithms through deterministic modelling.

UNIT III

Memory Management: address binding, logical and physical address space, dynamic loading and linking. Contiguous memory allocation: static and dynamic partitioned memory, fragmentation, swapping relocation, compaction, protection. Non-contiguous memory allocation: Paging Segmentation. Virtual Memory: demand paging, page fault, page replacement algorithms- FIFO, LRU, optimal. Thrashing, page fault frequency.

UNIT IV

Interprocess communication need for synchronization, Deadlocks- definition, avoidance, prevention, detection and recovery. Disk organization, Directory structure, disk space management- contiguous and non-contiguous allocation strategies, disk address translation, disk caching, disk scheduling algorithms. Device Management: dedicated devices, shared devices. Security and protection : security threats and goals, penetration attempts. Security policies and mechanisms, authentication, protection and access control.

UNIT V

Linux: History and features of Linux, Linux architecture, file system of Linux, hardware requirements, Linux standard directories, Linux Kernel.
Working with Linux: KDE and Gnome graphical interface, various types of shells available in Linux. Vi editor, Linux commands. File security in Linux.

TEXT BOOKS AND REFERENCE BOOKS

1. Operating system Concepts: by Silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

Suggested Practical

Basic Linux Commands and vi editor

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कक्षा बी.एस.सी. कम्प्यूटर विज्ञान स्वाध्यायी छात्रों हेतु

प्रथम वर्ष	सैद्धांतिक	योग	प्रायोगिक	कुल योग
Fundamentals of Computers	50	100	50	150
Programming in C	50			
द्वितीय वर्ष	50			
Object Oriented Programming Concept using C++	50	100	50	150
Data structures	50			
तृतीय वर्ष	50			
Database Management System	50	100	50	150
Operating System Concepts	50			
कुल योग				450

- Remark :
- (i) Each theory paper will contain five objective type question of 1 mark and
 - (ii) Five short answer type question of 3 marks and
 - (iii) Five long answer type question of 6 marks, with internal choice in (ii) and (iii)

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A. Rishi Yadav

Amur
28/4/17

Rujin Sacha
28/4

Adg/28/4
S.K. Singh
28/4/17

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बी.एस.सी. प्रथम कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र
फंडामेंटल ऑफ कम्प्यूटर्स

अधिकतम अंक : 50

न्यूनतम अंक: 17

इकाई- प्रथम

कम्प्यूटर का ब्लॉक डायग्राम: इनपुट इकाई, आउटपुट इकाई, सी.पी.यू., मेमोरी यूनिट, कम्प्यूटर के चरण, कम्प्यूटर के प्रकार : डेस्कटॉप, लेपटॉप, पॉमटाप, वर्कस्टेशन्स एवं सुपर कम्प्यूटर, सभी प्रकार की इनपुट एवं आउटपुट डिवाइस, हार्डवेयर, साफ्टवेयर एवं फर्मवेयर की अवधारणा

विन्डोज : विन्डोज के गुणधर्म- डेस्कटॉप, स्टार्ट मेन्यू, कन्ट्रोल पेनल, माय कम्प्यूटर, विन्डोज एक्सप्लोरर, एसेसरीज, मैनेजिंग मल्टीपल विन्डोज, डेस्कटॉप में आईकोन व्यवस्थित करना, फोल्डर को बनाना एवं व्यवस्थित करना, फाईल एवं ड्राईव को व्यवस्थित करना, लॉगिंग ऑफ एवं विन्डोज शटडाउन

इकाई- द्वितीय

वर्ड: वर्ड प्रोसेसिंग क्या है, एम.एस. वर्ड में डाक्यूमेन्ट बनाना, एम.एस. वर्ड के फार्मेटिंग फीचर्स, स्टेण्डर्ड टूलबार, ड्राईंग टूलबार, टेबल्स एवं अन्य फीचर्स, मेलमर्ज, फाईल्स का इन्सर्शन, पिक्चर, क्लिप बोर्ड, ग्राफ, प्रिंट फार्मेटिंग, पेज नम्बरिंग एवं प्रिंटिंग डाक्यूमेन्ट्स।

एक्सेल : वर्कशीट एवं एक्सेल का परिचय, वर्कशीट में जानकारी को प्रविष्ट करना, नंबरर्स, फार्मूला इत्यादी। वर्कबुक को सेव करना, एडिटिंग सेल्स, कमाण्ड एवं फंक्शन का उपयोग, मूविंग एवं कापिंग, रोज एवं कालम्स को इन्सर्ट एवं डीलिट करना, चार्ट बनाना, पेज सेटअप : मार्जिन, हेडर एवं फुटर को प्रिंटिंग से पहले जोड़ना, वर्कशीट का प्रिंट प्रिव्यू, प्रिंटआउट से ग्रिडलाईन अलग करना, टाईटल रो को प्रिन्ट करना।

इकाई- तृतीय

संख्या पद्धति: डेसिमल, वायनरी, ऑक्टेल, हेक्साडेसिमल, संख्या पद्धति में एक आधार से दूसरे आधार में परिवर्तन करना।

कोड्स : ASCII कोड, EBCDIC कोड, ग्रे कोड, बूलियन एलजेब्रा, डी मार्गन प्रमेय, वायनरी एर्थमेटिक: एडीशन, सब्सट्रैक्शन, मल्टीप्लीकेशन एवं डिवीजन, अनसाईन्ड बायनरी संख्यायें, साईन्ड मेग्नीट्यूड संख्यायें, संख्याओं का 1^s काम्प्लीमेन्ट एवं 2^s काम्प्लीमेन्ट में प्रदर्शन, 2^s काम्प्लीमेन्ट अर्थमेटिक, बूलियन फणशन एवं सत्यता सारणी, SOP, POS Form minterms/maxterms, बूलियन एलजेब्रा एवं karnaugh map के उपयोग से लाजिक सर्किट का सरलीकरण करना।

Logic Gates: - AND, OR, NOT, NAND, NOR, X-OR एवं X-NOR gates व उनके चिन्ह एवं truth tables, gates से सर्किट डिजाइन: एडर/सबट्रैक्टर।

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इकाई- चतुर्थ

मेमोरी सेल, प्राईमरी मेमोरी : RAM, स्टेटिक एवं डायनामिक RAM, ROM, PROM, EPROM, EEPROM
Cache मेमोरी, सेकेण्ड्री मेमोरी एवं उनके प्रकार, वर्चुअल मेमोरी की संधारणा, मेमोरी एक्सेसिंग मेथड:
सीरियल एवं रेन्डम एक्सेस ।

डेटाबस, कन्ट्रोल बस एवं एड्रेस बस, कम्प्यूटर की वर्ड लेन्थ, एक सीपीयू की मेमोरी एड्रेसिंग क्षमता, एक
कम्प्यूटर की प्रोसेसिंग स्पीड, माईक्रो प्रोसेसर, सिंगलचिप माईक्रो कम्प्यूटर(माईक्रो कन्ट्रोलर)

इकाई- पंचम

सीपीयू की सामान्य संरचना, इन्सट्रक्शन फार्मेट एवं डेटा ट्रान्सफर इन्सट्रक्शन, डेटा मेनीप्यूलेशन
इन्सट्रक्शन्स एवं प्रोग्राम कन्ट्रोल इन्सट्रक्शन। प्रोसेसर के प्रकार : अक्यूम्लेटर आधारित मशीन, स्टेक
आधारित मशीन एवं जनरल परपज रजिस्टर आधारित मशीन। एड्रेसिंग मोड्स।

डाटा ट्रान्सफर स्कीन्स : (1) प्रोग्राम्स डाटा ट्रान्सफर : synchronous, asynchronous एवं interrupt
driven data transfer : (2) Direct memory access Data transfer: Cycle stealing block transfer and
burst mode of data transfer.

Text book

1. Digital logic and Computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K.Taxali
4. Fundamentals of computers by P.K.Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K.Basandra
7. Computers Fundamentals and Architecture by B.Ram

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table

R. K. Kataria
28-4-2017

R. K. Kataria
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R. K. Kataria
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द्वितीय प्रश्न पत्र
प्रोग्रामिंग इन सी

अधिकतम अंक : 50

न्यूनतम अंक: 17

इकाई- प्रथम

प्रोग्राम लेग्वेज का वर्गीकरण : प्रोसीजरल लेग्वेज, प्रोवलम ओरियन्टेड लेग्वेज, नान प्रोसीजरल लेग्वेज। स्ट्रेक्चर्स प्रोग्रामिंग की अवधारणा - माड्यूलर प्रोग्राम : टाप डाऊन विश्लेषण, बॉटम अप विश्लेषण स्ट्रेक्चर प्रोग्रामिंग। कम्प्यूटर के द्वारा प्रोवलम को हल करना- प्रोवलम की परिभाषा एवं विश्लेषण, प्रोवलम डिजाईन, कोडिंग, कम्पाईलेशन, डीबगिंग एवं टेस्टिंग, डाक्यूमेन्टेशन, इम्प्लीमेन्टेशन एवं रखरखाव।

इकाई- द्वितीय

सी लेग्वेज का परिचय- कान्सटेन्ट, वेरियेबल्स, कीवर्ड्स, डाटा टाईप्स, ऑपरेटर्स, एक्सप्रेशन्स, ऑपरेटर प्रेसीडेन्स एवं एसोसिएटिविटी। सी प्रोग्राम का प्रारूप-वेरिवल को परिभाषित करना एवं वेरिवल को स्थिरांक के रूप में परिभाषित करना।

इकाई- तृतीय

इनपुट आउटपुट आपरेटर्स का रखरखाव-फार्मेटेड एवं अन फार्मेटेड, कन्ट्रोल स्टेटमेन्ट्स, ब्रान्चिंग, जम्पिंग एवं लूपिंग, स्कोप के नियम, स्टोरेज क्लास।

इकाई- चतुर्थ

एरै (सिंगल एवं डबल डार्इमेन्शनल), फंक्शन- यूजा द्वारा परिभाषित फंक्शन, स्टैन्डर्ड फंक्शन, फंक्शन के प्रकार। फंक्शन में अरग्यूमेन्ट पास करना, रिकर्शन, पाईन्टर : आपरेटर्स डिक्लेरेशन, पाईन्टर अर्थमेटिक, एरै आफ पाईन्टर। स्ट्रेक्चर्स-डिक्लेरिंग, एक्सेसिंग, इनिशियलाईजिंग, एरै आफ स्ट्रेक्चर्स।

इकाई- पंचम

सी में फाईल हेण्डलिंग: डाटा फाईल को ओपन एवं क्लोज करना, डाटा फाईल में डाटा प्रविष्ट करना, ग्राफिक्स प्रोग्रामिंग- परिचय, फंक्शन्स, स्टायलिस लाईन्स, ड्राइंग एवं फिलिंग इमेजस, पैलेट्स एवं कलर, जस्टीफाईंग टेक्स, बिट आफ एनीमेशन।

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Text Books-

Let us C by Yashwant Kanetkar IV Edition
ANSI C by E. Balagurusamy
Programming in C by S.S. Bhatia

Reference Books-

How to design Programs-An Introduction to programming and computing- Felleisen, et,al, PHI Publication
Introduction to Algorithms by Cormen.PHI
Programming in C: Denis Ritchie

Suggested list of programs for practical

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices.
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation .
7. Write a program for Marksheet.
8. Write a programme for finding the sum of given matrices of order $m \times n$
9. Write a programme for finding the multiplication of given matrices of order $m \times n$
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series
 $1+1/1!+2/2!+3/3!+-----+n/n!$
17. Write a program to create a pyramid structure
*
**

18. Write a program to create a pyramid structure
1
12
123
1234
19. Write a program to create a pyramid structure
1
22
333
4444
20. Write a program to reverse a string.
21. Write a program to find whether a given string is PALINDROME or not.
22. Write a program to input 10 numbers add it and find it's average.

Handwritten signature: Anurag...

Handwritten initials: PM

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23. Write a program to generate series
 $1 + 1/2! + 1/3! + \dots + 1/n!$
24. WAP to print table of any number.
25. WAP to print Fibonacci series
26. WAP to find length of string without using function.
27. WAP to perform all arithmetic operations using case statement.
28. WAP to check entered number is Armstrong or not.

R.K. Kataria
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बी.एस.सी. द्वितीय कम्प्यूटर विज्ञान

प्रथम प्रश्न पत्र

ऑब्जेक्ट ओरियन्टेड प्रोग्रामिंग कन्सेप्ट यूजिंग C++

अधिकतम अंक : 50

न्यूनतम अंक: 17

इकाई- प्रथम

C++ का परिचय : प्रोग्रामिंग पैराडिम, ऑब्जेक्ट ओरियन्टेड प्रोग्रामिंग के मूल अवधारणा, ऑब्जेक्ट ओरियन्टेड प्रोग्रामिंग के लाभ। C++ में इनपुट एवं आउटपुट : प्री डिफाईन्ड स्ट्रीम, अन फार्मेटेड कन्सोल इनपुट/आउटपुट संकियाएँ, फार्मेटेड कन्सोल इनपुट/आउटपुट संकियाएँ

इकाई- द्वितीय

C++ के डिक्लेरेशन्स : C++ प्रोग्राम के घटक, टोकन के प्रकार, कीवर्ड्स, आईडेन्टीफायर, डाटा टाईप्स, कान्स्टेन्ट, आपरेटर, आपरेटर की प्राथमिकता, रिफ्रेंशिंग एवं डीरिफ्रेंशिंग आपरेटर्स, स्कोप एक्सेस आपरेटर। कन्ट्रोल स्ट्रक्चर : डिसिजन मेकिंग स्टेटमेन्ट, लूपिंग स्टेटमेन्ट।

इकाई- तृतीय

फंक्शन: main(), फंशन के घटक, पासिंग आर्गुमेन्ट [वेल्यू, एड्रेस, रिफरेन्स], इन लाईन फंक्शनस, फंक्शन ओवर लोडिंग [सावधानी, सिद्धांत], लायब्रेरी फंक्शन।

क्लासेस एवं आवजेक्ट: डिक्लेरिंग [क्लासेस, आवजेक्ट], एक्सेसिंग क्लास मेमवर्स, कीवर्ड [पब्लिक, प्राईवेट, प्रोटेक्टेड], डिफाईनिंग मेम्बर फंक्शन [मेम्बर फंक्शन इनसाईड द क्लास, मेम्बर फंक्शन आउटसाईड द क्लास], स्टैटिक मेम्बर फंक्शनस एवं वेरियेबल, फ्रेन्ड फंक्शन, फ्रेन्ड क्लास, ओवर लोडिंग मेम्बर फंक्शन।

इकाई- चतुर्थ

कन्सट्रक्टर्स एवं डिस्ट्रक्टर्स : गुणधर्म, अनुप्रयोग, कन्सट्रक्टर्स आरगुमेन्ट के साथ, ओवर लोडिंग कन्सट्रक्टर, कन्सट्रक्टर्स के प्रकार।

आपरेटर ओवरलोडिंग: ओवरलोडिंग यूनरी आपरेटर, वायनरी आपरेटर।

इनहेरीटेन्स: एक्सेस स्पेसीफायर, पब्लिक इनहेरीटेन्स, प्राईवेट इनहेरीटेन्स, प्रोटेक्टेड डाटा प्राईवेट इनहेरीटेन्स के साथ, इनहेरीटेन्स के प्रकार [सिंगल, मल्टीपल, हिरारचिकल, मल्टीलेवल, हाईब्रिड, मल्टीपाथ], वर्चुअल वेस क्लास।

इकाई- पंचम

पाइन्टर एवं एरै: पाइन्टर डिक्लेरेशन पाइन्टर टू क्लास एवं आवजेक्ट।

एरै: डिक्लेरेशन एवं इनीसिलाईजेशन, एरै आफ क्लासेस।

(Rajendra)

(Rajendra)

Rajendra

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71 R.K. Kataria

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पालीमोरफिजम: स्टेटिक(अली) बाईडिंग, डायनामिक(लेट) बाईडिंग, बर्चुअल फंक्शन, प्योर बर्चुअल फंक्शन

Text books:

Object-Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane.

E. Balagurusamy: object oriented programming in C++

Reference Books:

Herbert Schildt: C++ the complete Reference- TMH publication.

Robert Lafore: Object Oriented Programming in C++.

Suggested list of programs for practical

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is Prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix.
9. Write a program to print :

*
**

10. Write a program to print :

1
2 2
3 3 3

11. Write a program to print :

1
2 3
4 5 6

12. Write a program to check whether entered string is palindrome or not.
13. Write a program to print Fibonacci series.
14. Write a program to find factorial of a given number.
15. Write a program to demonstrate use of static data member.
16. Write a program to demonstrate use of a static member function.
17. Write a program to create array of objects.
18. Write a program to demonstrate use of friend function.
19. Write a program to illustrate use of copy constructor.
20. Write a program to demonstrate constructor overloading.

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21. Write a program to illustrate use of destructor.
22. Write a program to overload a unary operator.
23. Write a program to overload a binary operator.
24. Write a program to demonstrate single Inheritance.
25. Write a program to demonstrate multiple Inheritance.
26. Write a program to demonstrate multilevel Inheritance.
27. Write a program to demonstrate hierarchical inheritance.
28. Write a program to demonstrate hybrid Inheritance.
29. Write a program to demonstrate the use of function overloading.
30. Write a program to demonstrate the use of inline member function.
31. Write a program to demonstrate the use of parameterized constructor.

R.K. Kataria
28-4-2017

Shruti
28-4-17

Rajshree
28/4

Kumar
28/4/17

Chhaya
28-4-17

Agg
28/4

Raj
28-4-17

Sk
28/4/17

Dr. C. S. Yadav

Devi

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बी.एस.सी. द्वितीय कम्प्यूटर विज्ञान
द्वितीय प्रश्न पत्र
डाटा स्ट्रक्चर्स

अधिकतम अंक : 50

न्यूनतम अंक: 17

इकाई- प्रथम

डाटा स्ट्रक्चर की अवधारणा एवं एल्गोरिथम, एब्सट्रेक्ट डाटा स्ट्रक्चर, स्टेक से परिचय एवं स्टेक पर प्राथमिक संक्रिया, स्टेक एक एब्सट्रेक्ट डाटा टाईप, स्टेक का अनुप्रयोग(infix, prefix, postfix & recursion) Queue से परिचय, Queue पर प्राथमिक संक्रिया, circular Queue, De Queue, Priority Queue & Queue के अनुप्रयोग

इकाई- द्वितीय

linked list का परिचय, linked list पर प्राथमिक संक्रिया, linked list के प्रयोग से स्टेक एवं Queue का निर्माण, Doubly linked list एवं सरक्यूलर लिंक लिस्ट, लिंक लिस्ट का अनुप्रयोजन

इकाई- तृतीय

Tree: प्राथमिक शब्दाबली, बायनरी ट्री, ट्री को एरै एवं लिंकड लिस्ट में प्रदर्शित करना, बायनरी ट्री में प्राथमिक संक्रियाएँ, बायनरी ट्री ट्रवर्सल: इनऑर्डर, प्रीऑर्डर, पोस्टऑर्डर, बायनरी ट्री के अनुप्रयोग, Threaded Binary Tree, AVL Tree, ट्री का बायनरी ट्री के रूप में प्रदर्शन।

इकाई- चतुर्थ

सीक्वेशियल सर्च, वाईनरी सर्च, इन्सर्शन सार्ट, सिलेक्शन सार्ट, क्विकसार्ट, बबल सार्ट, हीप सार्ट, सॉर्टिंग विधियों में तुलना।

इकाई- पंचम

हेश टेबल, कॉलीजन रिसाल्यूशन तकनीक, ग्राफ का परिचय, परिभाषा, शब्दाबली, डायरेक्टेड, अनडायरेक्टेड एवं वेटेडग्राफ, ग्राफ का प्रस्तुतीकरण, ग्राफ ट्रवर्सल- डेथ फर्स्ट, ब्रेडथ फर्स्ट सर्च, स्पेनिंग ट्री, न्यूनतम स्पेनिंग ट्री, सार्टेस्ट पाथ एल्गोरिथम।

Text Books-

Data Structures through C(A Practical Approach) G.S. Baluja

Data Structure: By Lipschuists (Schaum's Outline Series)

Data Structure: By Trembley & Sorrenson

Reference Books-

Fundamental of Data Structure By S. Sawhney & E. Horowitz

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R.K. Kataria
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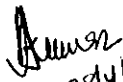
Suggested list of Programs for practical

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting.
6. Write a program for quick sorting.
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in the singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.

R.K. Kalera
28-4-2017


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Abhisek
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Rajendra Prasad
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28-4-17

AR (Rajendra)
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बी.एस.सी. तृतीय वर्ष कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र

डाटाबेस मैनेजमेन्ट सिस्टम

अधिकतम अंक : 50

न्यूनतम अंक: 17

इकाई- प्रथम

डाटाबेस सिस्टम का उद्देश्य, डाटा के व्यूह, डाटा मॉडल्स : रिलेशनल्स, नेटवर्क, हिराचिकल, इन्शटेन्सेस एवं स्कीमा, डाटा डिक्रिप्शनरी, डाटावेज लेग्वेज के प्रकार: डीडीएल, डीएमएल, डीबीएमएस की संरचना, डीबीएमएस के लाभ एवं हानी, 3- स्तरीय आर्किटेक्चरल संरचना : एक्टनल, कन्सेक्चुअल एवं इन्टर्नल लेवल्स

इकाई- द्वितीय

एन्टिटी रिलेशनशिप मॉडल के कन्सेक्चुअल डिजाइन टूल्स के रूप में : एन्टिटी एवं एन्टीटी सेट, रिलेशनशिप एवं रिलेशनशिप सेट, एट्रीव्यूट एवं मेपिंग कन्स्ट्रेंट, कुन्जी, ईआर डायग्राम: स्ट्रॉंग एवं वीक एनट्रीस, जनरलाईजेशन, स्पेसिलाईजेशन एवं एग्रीगेशन, रिड्यूसिंग ईआर डायग्राम टू टेबलस

इकाई- तृतीय

सेट थ्योरेटिक नोटेशन के मूलरूप सिद्धांत : रिलेशन, डोमेन्स, एट्रीब्यूटस, ट्यूपल्स, कुन्जी की अवधारणा- प्राईमरी कुन्जी, सुपर कुन्जी, आल्टर्नेट कुन्जी, केन्डीडेट कुन्जी, फारेन कुन्जी, समग्रता के मूलभूत नियम- एन्टीटी एवं रेफरेसियल समग्रता, एक्सटेंशन एवं इनटेंशन, रिलेशनल एलजेब्रा: सिलेक्ट, प्रोजेक्ट, कार्टीशियन प्रोजेक्ट, ज्वाइन के विभिन्न प्रकार: थीटा, इक्यू, नेचुरल, आउटर ज्वाइनस, सेट ऑपरेशन।

इकाई- चतुर्थ

फंक्शन डिपेन्डेन्सी, गुड एवं बेड डिकम्पोजिशन एवं डाटावेज एक एनार्मलाईस जैसा : बेड डिजाइन के प्रभाव, यूनीवर्सल रिलेशन, नार्मलाईजेशन : 1NF, 2NF, 3NF & BCNF नार्मल फार्म, मल्टीवेल्यूड डिपेन्डेन्सी, ज्वाइन डिपेन्डेन्सी, 4NF, 5NF

इकाई- पंचम

मूल अवधारणा: इनडेक्सिंग एवं हेसिंग, बी-ट्री इन्डेक्स फाईल, हेसिंग: स्टेटिक एवं डायनामिक हेस फलन, एसक्यूएल में इन्डेक्स की परिभाषा: मल्टीपल की एक्सेस।

Text Books-

Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication
Database System Concepts by Henry Korth and A. Silberschatz.

Reference Books- An Introduction to Database System by Bipin Desai

An Introduction to Database System by C.J.Date.

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Rajendra

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Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.
15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation'. Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'newsalary'
24. List the employee number of employee who belone to department 10,20.
25. List the employe no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two 'aa' in the name
29. Print the name , emp no, sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

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R.K. Tatore

28-4-2017

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बी.एस.सी. तृतीय वर्ष कम्प्यूटर विज्ञान
द्वितीय प्रश्न पत्र
ऑपरेटिंग सिस्टम कन्सेप्ट्स

अधिकतम अंक : 50

न्यूनतम अंक: 17

इकाई- प्रथम

आपरेटिंग सिस्टम : परिभाषा, इसके अवयव, आपरेटिंग सिस्टम की उत्पत्ती, इसके प्रकार : बैच, मल्टीप्रोग्रामिंग, मल्टीटास्किंग, मल्टी प्रोसेसर, रियल टाइम, क्लाइंट सर्वर, पियर टू पियर , डिस्ट्रीब्यूटेड, क्लस्टर, आपरेटिंग सिस्टम सर्विसेज, सिस्टम कॉल, I/O का प्रोटेक्शन, मेमोरी और सीपीयू।

इकाई- द्वितीय

प्रोसेस शेड्यूलिंग : प्रोसेस के सिद्धांत , प्रोसेस की अवस्था, पीसीबी, प्रोसेस लाइफ सायकल, आपरेशन आन प्रोसेस, कांटेक्स्ट स्विच, शेड्यूलर के प्रकार CPU burst-I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue, निर्धारण माडलिंग के द्वारा एल्गोरिथम का मूल्यांकन।

इकाई- तृतीय

मेमोरी मैनेजमेन्ट: एड्रेस वाइंडिंग, लाजिकल एवं फिजिकल ऐड्रेस स्पेस, डायनामिक लोडिंग और लिंकिंग। कन्टीन्यूअस मेमोरी एलोकेशन : स्टैटिक और डायनामिक पार्टीशन मेमोरी, फ्रैगमेंटेशन, स्वेपिंग रिलोकेशन, कम्पैक्शन, प्रोटेक्शन। नॉन कन्टीन्यूअस मेमोरी एलोकेशन : पेजिंग, सिग्मेन्टेशन। वर्चुअल मेमोरी : डिमांड पेजिंग, पेज फाल्ट, पेज रिप्लेशमेन्ट एल्गोरिथम्स- FIFO, LRU, Optimal. थ्रासिंग, पेज फाल्ट फिक्वेन्सी।

इकाई- चतुर्थ

इंटरप्रोसेस कम्यूनिकेशन: सिंक्रोनाइजेशन की आवश्यकता, डेडलॉक- परिभाषा, एवायडेंस, प्रिवेन्शन, डिटेक्शन और रिकवरी, डिस्क आर्गनाइजेशन, डायरेक्ट्री स्ट्रक्चर, डिस्क स्पेस मैनेजमेंट- कंटिग्युअस और नॉन कंटिग्युअस एलोकेशन स्ट्रेटजी, डिस्क एड्रेस ट्रांसलेशन, डिस्क कौचिंग, डिस्क शेड्यूलिंग एल्गोरिथम, डिवाइस मैनेजमेंट : डेडीकेटेड डिवाइस, शेयर डिवाइस, सिक्वोरिटी और प्रोटेक्शन: सिक्वोरिटी- थ्रेट्स और गोल, प्रवेश का प्रयास, सिक्वोरिटी नितियाँ और तंत्र, प्रमाणीकरण , प्रोटेक्शन एक्सेस कन्ट्रोल।

इकाई- पंचम

Linux: Linux का इतिहास और विशेषताएँ Linux संरचना, Linux फाइल सिस्टम, हार्डवेयर आवश्यकता, Linux स्टेण्डर्ड डायरेक्ट्रीज, Linux Kernel. Linux की क्रिया विधि : KDE एवं Gnome, ग्राफिकल इन्टरफेस, Linux में शेल के प्रकार, Vi एडीटर, Linux कमाण्ड्स, Linux में फाइल की सुरक्षा।

R.K. Kabare
28-4-2017

Rajendra
28-4-17

Skumar
28-4-17

A. K. Singh
28-4-17

Rajendra
28-4-17

A. K. Singh
28-4-17

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Suggested Practical

Basic Linux Commands and vi editor

R.K. Patel
28-4-2017

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(Signature)
28.4.17

(Signature)
28/4/17

Aug 28/17
Rajesh Kumar
28/4

(Signature) (Rajesh Kumar)

(Signature)